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COMMITTEE ON THE PEACEFUL
USES OF OUTER SPACE

REPORT OF THE SCIENTIFIC AND TECHNICAL SUBCOMMITTEE ON THE WORK OF ITS THIRTY-SECOND SESSION

INTRODUCTION

1. The Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space held its thirty-second session at the United Nations Office at Vienna from 6 to 16 February 1995 under the chairmanship of Professor J. H. Carver (Australia).

2. Representatives of the following Member States attended the session: Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, China, Colombia, Cuba, Czech Republic, Ecuador, Egypt, France, Germany, Greece, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Italy, Japan, Lebanon, Mexico, Morocco, Netherlands, Nicaragua, Nigeria, Pakistan, Philippines, Poland, Portugal, Republic of Korea, Romania, Russian Federation, South Africa, Spain, Sudan, Sweden, Syrian Arab Republic, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland, United States of America, Uruguay and Venezuela.

3. Representatives of the following specialized agencies attended the session: Food and Agriculture Organization of the United Nations (FAO), United Nations Educational, Scientific and Cultural Organization (UNESCO), International Civil Aviation Organization (ICAO), World Health Organization (WHO), International Telecommunication Union (ITU), World Meteorological Organization (WMO), United Nations Industrial Development Organization (UNIDO) and International Atomic Energy Agency (IAEA).

4. Representatives of the Association of Space Explorers (ASE), European Space Agency (ESA), Committee on Space Research (COSPAR) of the International Council of Scientific Unions (ICSU), International Astronautical Federation (IAF) and International Society for Photogrammetry and Remote Sensing (ISPRS) also attended the session.

5. A list of the representatives of Member States, specialized agencies and other international organizations attending the session is contained in document A/AC.105/C.1/INF.24.

6. On 6 February, the Subcommittee adopted the following agenda:

1. Adoption of the agenda.

2. Statement by the Chairman.

3. General exchange of views.

4. United Nations Programme on Space Applications and the coordination of space activities within the United Nations system.

5. Implementation of the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space.

6. Matters relating to remote sensing of the Earth by satellites, including, inter alia, applications for developing countries.

7. Use of nuclear power sources in outer space.

8. Space debris.

9. Questions relating to space transportation systems and their implications for future activities in space.

10. Examination of the physical nature and technical attributes of the geostationary orbit; examination of its utilization and applications, including, inter alia, in the field of space communications, as well as other questions relating to space communications developments, taking particular account of the needs and interests of developing countries.

11. Matters relating to life sciences, including space medicine.

12. Progress in national and international space activities related to the Earth environment, in particular progress in the Geosphere-Biosphere Programme (Global Change).

13. Matters relating to planetary exploration.

14. Matters relating to astronomy.

15. The theme fixed for special attention at the 1995 session of the Scientific and Technical Subcommittee: "Application of space technology for education, with particular emphasis on its use in developing countries".

16. Other matters.

17. Report to the Committee on the Peaceful Uses of Outer Space.

A. Meetings and documentation

7. The Subcommittee held 17 meetings.

8. A list of the documents which were before the Subcommittee is provided in annex I to the present report.

9. Following the adoption of the agenda, the Chairman made a statement outlining the work of the Subcommittee at its current session and welcomed the new members of the Committee to the Subcommittee. He also reviewed the activities of States Members of the United Nations in the field of space exploration, including important advances that had been achieved as a result of international cooperation during the past year.

10. At the 448th, 449th, 450th and 452nd meetings, the Chairman informed the Subcommittee that requests had been received from the permanent representatives of Algeria, Ethiopia, Peru, Slovakia, Thailand and Tunisia, and from the League of Arab States, to attend the session. Following past practice, those delegations were invited to attend the current session of the Subcommittee and to address it as appropriate. That was without prejudice to further requests of that nature and did not involve any decision of the Subcommittee concerning status, but was a courtesy that the Subcommittee extended to those delegations.

11. General statements were made by the following delegations: Argentina, Austria, Brazil, Bulgaria, Canada, Chile, China, Colombia, Cuba, Czech Republic, Ecuador, France, Germany, Greece, Hungary, India, Indonesia, Iran (Islamic Republic of), Mexico, Morocco, Philippines, Republic of Korea, Romania, Russian Federation, South Africa, Spain, Sweden, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland and United States of America. General statements were also made by the representatives of ITU, ASE, COSPAR and IAF.

12. At the 448th meeting, the Director of the Office for Outer Space Affairs made a statement reviewing the work programme of the Office. At the 452nd meeting, the Expert on Space Applications made a statement outlining the activities carried out and planned under the United Nations Programme on Space Applications.

B. Technical presentations

13. In accordance with General Assembly resolution 49/34, paragraph 13 (b) (vii), of 9 December 1994, a symposium on the theme "Application of space technology for education, with particular emphasis on its use in developing countries" was organized by COSPAR and IAF to complement discussions within the Subcommittee on the special theme. The first session of the symposium, entitled "Policy issues regarding space education", was held on 6 February and was co-chaired by Mr. H. H. von Muldau, representing IAF, and Mr. K. Kasturirangan, representing COSPAR. The second session of the symposium, entitled "Applications of space technology in space education", was held on 7 February and was co-chaired by Mr. S. Bauer, representing COSPAR, and Mr. H. H. von Muldau, representing IAF. Mr. R. Gibson of IAF was the Rapporteur for both sessions of the symposium.

14. The presentations to the symposium included: "Applications for space technology for education: the Indian experience, solutions and perspectives of the future" by Mr. M. G. Chandrasekhar, Scientific Secretary, Indian Space Research Organization (ISRO); "French experience in space education" by Mr. L. Laidet, Directeur de la Communication du Centre national d'études spatiales (CNES); "South American perspectives on the application of space technology for education: the example of Brazil" by Ms. F. de Oliveira, Public Affairs Office, Instituto Nacional de Pesquisas Espaciais (INPE); "ISRO video: Interactive satellite-based television broadcasting systems for education and training - towards operational systems" by Mr. K. Kasturirangan, Chairman, ISRO; "Space education activities in the U.S." by Ms. Beth Masters, Director of International Relations, National Aeronautics and Space Administration (NASA); "University education in space science and engineering" by Mr. D. Abir, Tel Aviv University, Israel National Commission on Space Research; and "The intelligent satellite data information system ISIS of DLR" by Mr. G. Strunz, Deutsche Forschungsanstalt für Luft- und Raumfahrt e.V. (DLR), Deutsches Fernerkundungsdatenzentrum.

15. In response to General Assembly resolution 49/34, Mr. Y. Trempat, France, Mr. M. G. Chandrasekhar, India, Mr. E. Wnuk, Poland, Mr. Richard Crowther, United Kingdom and Mr. Walter Flury, ESA, made special presentations on the complex issue of space debris and the solutions currently being adopted at the national level.

16. During the course of the session, scientific and technical presentations were made by Mr. W. Elliott and Ms. W. Loly, Canada, on down-to-Earth education; Mr. W. Riedler, Austria, on spacecraft potential control

and related research; Mr. P. Korobenkov, ITU, on the ITU and international geostationary-satellite orbit/spectrum management; Mr. D. McNally, ICSU, on adverse environmental impacts on astronomy; Mr. H. Hinghofer-Szalkay, Austria, on ASM and the Russian long-term flight project; Mr. Brian Wade, AEA Technology, United Kingdom, on nuclear power sources; Ms. Yifang Ban, International Space University, on GATES: Global Access to Telehealth and Education Systems; Mr. V. Kojarnovitch, UNIDO, on spin-off benefits of space technology; Ms. M. Chevrel, CNES, on French space efforts in the area of the environment; Mr. V. S. Nikolaev, Russian Federation, Ministry of Atomic Energy, on nuclear power sources in outer space; Ms. Margaret Finarelli, Globe Program, United States, on the Globe Program; Mr. Jean-Claude Cazaux, SCOT Conseil, France, on the uses of SPOT in developing countries; Ms. Evgeniya Volokhova, Ministry of Education, Russian Federation, on the use of space technology for education; and Mr. Victor Iatsouk, Communications Section, ICAO, on the CNS/ATM Programme.

C. Recommendations of the Scientific and Technical Subcommittee

17. After considering the various items before it, the Subcommittee, at its 464th meeting, on 16 February 1995, adopted its report to the Committee on the Peaceful Uses of Outer Space containing its views and recommendations as set out in the paragraphs below.

I. UNITED NATIONS PROGRAMME ON SPACE APPLICATIONS AND THE COORDINATION OF SPACE ACTIVITIES WITHIN THE UNITED NATIONS SYSTEM

II. IMPLEMENTATION OF THE RECOMMENDATIONS OF THE SECOND UNITED NATIONS CONFERENCE ON THE EXPLORATION AND PEACEFUL USES OF OUTER SPACE

18. In accordance with General Assembly resolution 49/34, the Subcommittee continued its consideration of the above-mentioned items. In accordance with past practice, the Subcommittee considered the two items jointly.

19. The Subcommittee noted that the General Assembly, in resolution 49/34, paragraph 19, had once again emphasized the urgency and importance of implementing fully the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82). The Subcommittee also took note of paragraph 14 of the same resolution, in which the General Assembly considered that, in the context of the Subcommittee's consideration of the item, it was particularly urgent to implement the following recommendations:

"(a) All countries should have the opportunity to use the techniques resulting from medical studies in space;

"(b) Data banks at the national and regional levels should be strengthened and expanded and an international space information service should be established to function as a centre of coordination;

"(c) The United Nations should support the creation of adequate training centres at the regional level, linked, whenever possible, to institutions implementing space programmes; necessary funding for the development of such centres should be made available through financial institutions;

"(d) The United Nations should organize a fellowship programme through which selected graduates or postgraduates from developing countries should get in-depth, long-term exposure to space technology

or applications; it is also desirable to encourage the availability of opportunities for such exposure on other bilateral and multilateral bases outside the United Nations system."

20. In response to the recommendations of the Working Group of the Whole to Evaluate the Implementation of the Recommendations of UNISPACE 82, contained in its report on the work of its eighth session, held in 1994 (A/AC.105/571, annex II, paras. 6-21), which were endorsed by the General Assembly in resolution 49/34, paragraph 16, the Subcommittee had before it the following documents: a report on international cooperation in the peaceful uses of outer space: activities of Member States (A/AC.105/592 and Adds.1, 2, 3 and 4), containing information submitted by Member States in response to paragraph 10 of the report of the Working Group; a technical study on the participation of developing countries in the Global Change Programme and possibilities of enhancing it (A/AC.105/590), in response to paragraph 17 (f); and a technical study on satellite-based radio broadcasting services (A/AC.105/591), in response to paragraph 17 (b). The Subcommittee also had before it the following document: a report on international cooperation in the peaceful uses of outer space: programmes of international organizations (A/AC.105/601), in response to paragraph 11 of the report of the Working Group. In addition, the Subcommittee had before it annual reports, including information in response to paragraph 11, submitted by the following international organizations: WMO (A/AC.105/597), European Telecommunications Satellite Organization (A/AC.105/598), International Telecommunications Satellite Organization (A/AC.105/599), European Organization for the Exploration of Meteorological Satellites (A/AC.105/600), ITU (A/AC.105/603) and ISPRS (A/AC.105/604).

21. In accordance with General Assembly resolution 49/34, paragraph 15, the Subcommittee reconvened the Working Group of the Whole with a view to improving the execution of activities relating to international cooperation, particularly those included in the United Nations Programme on Space Applications, and to proposing concrete steps to increase such cooperation as well as to make it more efficient. The Working Group of the Whole was chaired by Mr. Muhammed Jameel (Pakistan); it held four meetings between 8 and 16 February 1995 and adopted its report on 16 February 1995.

22. Having considered the report of the Working Group of the Whole, the Subcommittee decided at its 464th meeting, on 16 February 1995, to adopt that report, as contained in annex II to the present report, on the understanding that the recommendations contained therein would be carried out in accordance with General Assembly resolution 37/90, paragraph 9, of 10 December 1982. The Subcommittee recommended that the Working Group be reconvened next year to continue its work.

A. United Nations Programme on Space Applications

23. Regarding the expanded United Nations Programme on Space Applications, the Subcommittee had before it the report of the United Nations Expert on Space Applications (A/AC.105/595). The report was supplemented by a statement by the Expert. The Subcommittee noted that the Programme on Space Applications for 1994 had been carried out satisfactorily and commended the work accomplished by the Expert in carrying out the work programme as endorsed by the Subcommittee at its previous session.

24. The Subcommittee noted with appreciation that since its previous session additional contributions had been offered by various Member States and organizations and that they had been acknowledged in paragraph 72 of the Expert's report.

25. The Subcommittee continued to express its concern over the still limited financial resources available for carrying out the Programme and appealed to Member States to support the Programme through voluntary contributions. The Subcommittee felt that the limited resources of the United Nations should be focused on the highest priority activities and noted that the Programme on Space Applications was the priority activity of the Office for Outer Space Affairs.

1. 1994-1995

(a) United Nations training courses, workshops, conferences and symposia

26. With regard to the activities of the programme carried out in 1994, the Subcommittee expressed its appreciation to the following:

(a) The Government of Italy for co-sponsoring, through the United Nations Trust Fund for New and Renewable Sources of Energy, the United Nations/ESA Training Course for Latin American and Caribbean Countries on the Monitoring of Natural Resources, Renewable Sources of Energy and the Environment using Data from ERS-1, organized jointly with the Department for Development Support and Management Services of the United Nations, hosted by the European Space Research Institute (ESRIN) of ESA and held at Frascati, Italy, from 18 to 28 April 1994 and at Rome on 29 April 1994;

(b) The Government of Sweden, represented by the Swedish Board for Investment and Technical Support (BITS), for co-sponsoring the Fourth United Nations Training Course on Remote Sensing Education for Educators, hosted by Stockholm University and the Swedish Space Corporation Satellitbild and held at Stockholm and Kiruna, Sweden, from 2 May to 10 June 1994;

(c) The Government of Egypt, for co-sponsoring the Fourth United Nations/ESA Workshop on Basic Space Science, held at Cairo, Egypt, from 27 June to 1 July 1994;

(d) The Government of China, for co-sponsoring the United Nations/ESA Workshop on Microwave Remote Sensing Applications, hosted by the State Science and Technology Commission of China (SSTCC) and its National Remote Sensing Centre (NRSC) and held in Beijing, from 14 to 18 September 1994;

(e) The Government of Peru, for co-sponsoring the United Nations/ESA Workshop on Global Change and the Training Course on Microwave Remote Sensing Applications, hosted by the Comisión Nacional de Investigación y Desarrollo Aeroespacial (CONIDA) and held consecutively from 3 to 4 and from 5 to 14 October 1994, respectively, at the headquarters of CONIDA at Lima;

(f) The Government of Austria, as well as the State of Styria, the City of Graz and ESA, for co-sponsoring the United Nations Workshop on Enhancing Social, Economic and Environmental Security through Space Technology, hosted by the Austrian Federal Ministry for Foreign Affairs and held at Graz, Austria, from 12 to 15 September 1994;

(g) ESA and the Commission of the European Communities (CEC), for co-sponsoring the United Nations/International Astronautical Federation Symposium on Benefits of Space Technology for the Developing World: from Economic Growth to Environmental Protection, hosted by the Israeli National Committee on Space Research (NCSR) and held in conjunction with the 45th IAF Congress in Israel, from 6 to 9 October 1994.

27. The Subcommittee took note of the status of the planned United Nations workshops, training courses and conferences being held in 1995, which included the following activities, as described in the Expert's report (A/AC.105/595, annex III):

(a) United Nations Meeting of Experts on the Development of Education Curricula for the Centres for Space Science and Technology Education, being organized in cooperation with the Government of Spain, to be held at Granada, from 27 February to 3 March 1995;

(b) Fifth United Nations/Sweden International Training Course on Remote Sensing Education for Educators, being organized in cooperation with the Government of Sweden, to be held at Stockholm, from 1 May to 9 June 1995;

(c) United Nations/ESA International Microwave Remote Sensing Training Course for Asia and the Pacific countries on Applications of ERS-1 Data for Natural Resources, Renewable Energy and the Environment, being organized jointly with the Department for Development Support and Management Services of the United Nations, and to be held at ESRIN, Frascati, Italy, from 28 April to 5 May 1995;

(d) United Nations/ESA Training Course on the Use of ERS-1 Data for Mapping and Inventory of Natural Resources in Africa, being organized for the benefit of African French-speaking countries, to be held at Libreville, Gabon, from 15 to 19 May 1995;

(e) United Nations/ESA Workshop on the Applications of Space Techniques to Prevent and Combat Disasters, being organized for the benefit of African English-speaking countries, to be held at Harare, Zimbabwe, from 22 to 26 May 1995;

(f) United Nations/INTA/ESA International Workshop on Small Satellite Missions, being organized in cooperation with the Government of Spain, to be held at Madrid, Spain, from 13-17 November 1995;

(g) United Nations/USA International Workshop on Spin-off Benefits of Space Technology: Challenges and Opportunities, being organized in cooperation with the Government of the United States of America, to be held from 16 to 20 October 1995;

(h) United Nations Regional Conference on Space Technology for Sustainable Development in Latin America and the Caribbean, being organized in cooperation with the Government of Mexico and ESA, to be held at Puerto Vallarta, Mexico, from 30 October to 3 November 1995;

(i) Fifth United Nations/ESA Workshop on Basic Space Science, being organized in cooperation with the Government of Pakistan for the benefit of Member States in the Asia and the Pacific region, to be held at Karachi, from 6 to 10 November 1995;

(j) United Nations/International Centre for Theoretical Physics Workshop on Optics in Space Science and Technology, to be held at Trieste, Italy, from 20 to 25 November 1995;

(k) United Nations Workshop on the Use of Space Techniques for the Monitoring and Control of the Desert Environment, being organized in cooperation with the Government of the Syrian Arab Republic for the benefit of Member States in the Economic and Social Commission for Western Asia region, to be held at Damascus, Syrian Arab Republic, from 20 to 24 November 1995;

(l) United Nations/Austria/ESA Workshop on Benefits of Space Technology, being organized in cooperation with the Government of Austria, the State of Styria, the City of Graz and ESA, to be held at Graz, Austria, from 4 to 7 September 1995;

(m) United Nations/IAF/CEC/ESA Workshop on Space Technology for the Developing World, being organized in cooperation with the Government of Norway, to be held at Oslo, from 29 September to 1 October 1995.

(b) Long-term fellowships for in-depth training

28. The Subcommittee expressed appreciation to the Governments of Brazil and China as well as to ESA for having offered training fellowships in various areas relating to space activities for the period 1993-1994. The Subcommittee once again expressed appreciation to those Governments and agencies who had offered to renew fellowships for the period 1994-1995. The status of the 1994-1995 fellowships and the countries whose candidates have received fellowships were indicated in annex II of the Expert's report.

29. The Subcommittee noted that it was important to increase the opportunities for in-depth education in all areas of space science, technology and applications projects through long-term fellowships.

(c) Technical advisory services

30. The Subcommittee took note of the technical advisory services being provided by the Programme on Space Applications of the Office for Outer Space Affairs in support of regional space applications projects, as indicated in the report of the Expert:

(a) Collaboration with ESA on a survey and selection of projects to receive remote-sensing data made available by ESA to African countries covered by two ESA remote-sensing ground receiving stations at Maspalomas, Spain and Fucino, Italy;

(b) Assistance to the Government of Ecuador in promoting regional operation, administration and funding of the remote sensing receiving station at Cotopaxi, Ecuador;

(c) Assistance to the Government of Chile in its follow-up, as pro tempore secretariat, of the recommendations of the Second Space Conference of the Americas;

(d) Assistance to the Government of the Republic of Korea in the establishment of the Asia-Pacific Satellite Communications Council;

(e) Collaboration with ESA on the implementation of a project, entitled COPINE. This project will address one of the recommendations of the Dakar Regional Conference on Space Technology for Sustainable Development in Africa, held in October 1993, regarding the urgent need to establish an efficient communications network/linkage among African professionals and scientists at national, subregional and continental levels;

(f) Collaboration with ESA and the Department for Development Support and Management Services of the United Nations in follow-up activities related to the recommendations of the April 1994 Training Course on Applications of ERS-1 Data for Natural Resources, Renewable Energy and the Environment, held at Frascati, Italy.

(d) Promotion of greater cooperation in space science and technology

31. The Subcommittee noted that the United Nations was collaborating with international professional bodies in the space community to promote exchange of experience on space activities and that in this respect, the Office for Outer Space Affairs is co-sponsoring, together with the Explorers Club, the International Conference on Near Earth Objects, to be held in New York from 24 to 26 April 1995, and co-sponsoring, together with the Hungarian Institute for Geodesy, Cartography and Remote Sensing, the Third International Seminar on the Global Positioning System in Central Europe, to be held at Penc, Hungary, in May 1995. In this connection, in 1994, the Programme on Space Applications co-sponsored the following activities:

(a) A United Nations/IAF/CEC/ESA Symposium on Benefits of Space Technology for the Developing World: From Economic Growth to Environmental Protection, held in Israel, from 6 to 9 October 1994, in conjunction with the 45th IAF Congress;

(b) A United Nations/APSCC/Republic of Korea Workshop on Satellite Communications, held at Seoul, from 26 to 29 October 1994.

2. 1996

(a) United Nations training courses, workshops and symposia

32. The Subcommittee recommended the approval of the following programme of training courses, workshops and symposia proposed for 1996:

(a) Sixth United Nations/Sweden International Training Course on Remote Sensing Education for Educators;

(b) Second United Nations Regional Conference on Space Technology for Sustainable Development in Africa;

(c) Sixth United Nations/ESA Workshop on Basic Space Science;

(d) Second United Nations Workshop on Spin-off Benefits of Space Exploration;

(e) United Nations/ESA International Microwave Remote Sensing Training Course;

(f) Second Workshop on Payloads on Small Satellites;

(g) United Nations International Training Course on Communications Technology for Development;

(h) United Nations Workshop on Radar Remote Sensing Applications;

(i) United Nations Workshop on the Prevention and Mitigation of Effects of Natural Disasters.

B. International space information service

33. The Subcommittee noted with satisfaction that the Office for Outer Space Affairs was in the process of developing an international space information system, including both information within the United Nations system and access to external databases.

34. The Subcommittee noted with satisfaction the publication of a document entitled "Seminars of the United Nations Programme on Space Applications: selected papers on remote sensing, satellite communications and space science" (A/AC.105/584).

C. Reports

35. The Subcommittee took note with appreciation of the reports submitted to it by Member States and international organizations in response to the recommendations of the Working Group of the Whole in its

report on the work of its eighth session. It also noted with satisfaction that the Secretariat had prepared technical studies on the participation of developing countries in the Global Change Programme and their possibilities of contributing to it (A/AC.105/590), and on satellite-based radio broadcasting services (A/AC.105/591).

D. Coordination of space activities within the United Nations system and inter-agency cooperation

36. The Subcommittee noted that the General Assembly, in its resolution 49/34, had reaffirmed its request to all organs, organizations and bodies of the United Nations system and other intergovernmental organizations working in the field of outer space or on space-related matters to cooperate in the implementation of the recommendations of UNISPACE 82.

37. The Subcommittee noted with satisfaction that the Inter-Agency Meeting on Outer Space Activities was convened at the United Nations Office at Vienna, from 3 to 5 October 1994, and that its report (A/AC.105/582) was before the Subcommittee. The Subcommittee took note of the information provided on the progress achieved in coordinating the space activities of the organizations of the United Nations system and expressed its appreciation for the report of the Secretary-General entitled "Coordination of outer space activities within the United Nations system: programmes of work for 1995 and 1996 and future years" (A/AC.105/587).

38. The Subcommittee continued to stress the necessity of ensuring continuous and effective consultations and coordination in the field of outer space activities among organizations within the United Nations system and the avoidance of duplication of activities. The Subcommittee noted that future sessions of the Inter-Agency Meeting on Outer Space Activities would be convened at the United Nations Office at Vienna, and hosted by the Office for Outer Space Affairs, during late September or early October each year, without prejudice to any invitation by an interested agency to host a session at its headquarters.

E. Regional and interregional cooperation

39. The Subcommittee noted that the General Assembly, in its resolution 49/34, had reaffirmed its approval of the recommendations of UNISPACE 82 regarding the establishment and strengthening of regional mechanisms of cooperation, and their promotion and creation through the United Nations system. The Subcommittee noted with satisfaction that, in carrying out various activities in the implementation of the recommendations of UNISPACE 82, the Secretariat had sought to strengthen those mechanisms.

40. The Subcommittee noted with appreciation the efforts undertaken as part of the United Nations Programme on Space Applications, in accordance with the UNISPACE 82 recommendation concerning the development of indigenous capabilities, to establish regional centres for space science and technology education in existing national or regional educational institutions in developing countries, as outlined in the report of the Expert on Space Applications.

41. The Subcommittee noted with appreciation the offers by a number of Member States to host such regional centres and indications of support and participation from other Member States. The Subcommittee noted that evaluation missions concerning the establishment of such regional centres had been carried out in all developing regions. The Subcommittee further noted that each centre would continue expanding and would become part of a network with subsidiary nodes to cover specific programme elements in established institutions related to space technology in each region.

42. The Subcommittee noted that arrangements for the establishment of a centre in Brazil and in Mexico are being undertaken and that Brazil and Mexico had reaffirmed their commitment to the prompt establishment of a centre for the Latin American and Caribbean region and expressed their view that effective

coordination and cooperation within the Secretariat units involved in this matter and between those countries and the Secretariat would be crucial to achieving this goal. The Subcommittee also noted the support of other Latin American countries for the early establishment and operation of the centre.

43. The delegations of Argentina and Chile also expressed the will of their Governments to participate actively in the work and activities of the centre in the Latin American and Caribbean region, and their intention of being members of the Board of Governors for that centre.

44. The Subcommittee noted that, following an evaluation mission, the Office for Outer Space Affairs made the decision that the centre in the Asia and Pacific region would be established in India and that it would subsequently grow as a network institution with major nodes to cover specific programme elements in established institutions related to space technology in the region.

45. With regard to the centre in the Asia and Pacific region, India reaffirmed its commitment to establish the Centre as soon as possible and expressed the hope that, with the participation and support of the United Nations and the countries in the region, the centre would grow, and reported that a planning meeting had been held at Bangalore, India, on 24 and 25 January 1995, to which representatives of countries in the region that had offered to host the centre had been invited, as were other developing countries in the region with significant space activities. In addition, the representatives of the Secretariat of the United Nations and of the Economic and Social Commission for Asia and the Pacific (ESCAP) participated in the meeting. It was also reported that the meeting discussed the steps planned for starting the centre and considered a draft agreement that would be circulated to all countries of the region.

46. The view was expressed that the process that had been utilized in the selection of the host country for the regional Centre for Space Science and Technology Education in the Asia and Pacific region was flawed because it was inconsistent with the principle of democratic consultation and that, although the Office for Outer Space Affairs was aware of the different views of Member States on this matter, the selection had not been based on consultations among Member States of the region nor on the consensus agreement of Member States of the region that are members of the Committee. The view was also expressed that the procedure utilized for the selection of the host country would affect whether or not the centre could smoothly carry out its mission.

47. Some delegations expressed the view that information on the establishment of the centres, including a review of the status of ongoing negotiations and programmes proposed for them, should be provided to all interested delegations on a continuous basis, possibly through the convening, by the United Nations, of regular meetings of all interested countries within a region.

48. In response to the concerns expressed by Member States with regard to the centres in the Latin American and Caribbean and the Asia and Pacific regions, the Expert on Space applications made a statement clarifying the procedures used in the selection process of host countries and the Secretariat provided Member States with the text of a draft agreement for the establishment of those centres containing the general obligations to be undertaken by the United Nations in that regard.

49. It was further noted that discussions on the establishment of a centre for the Economic Cooperation Organization (ECO) are in progress with the Government of the Islamic Republic of Iran. With regard to a centre for the region covered by the Economic Commission for Africa (ECA), the Subcommittee noted that an evaluation mission had been undertaken to the countries that had offered to host the centre in that region. As one of those countries visited by the mission, Morocco reaffirmed its offer to host the centre for Africa and requested additional information on the status of the process for establishment of that centre as well as information on possible funding sources. It was also noted that the Syrian Arab Republic had reaffirmed its offer to host the centre for the region covered by the Economic and Social Commission for Western

Asia (ESCWA) at its National Centre for Remote Sensing and had reported on recent discussions it has had to that end with various United Nations entities.

50. The Subcommittee noted with satisfaction that the Ministerial Conference on Space Applications for Development in Asia and the Pacific Region and its Preparatory Meeting of Senior Officials were organized by ESCAP and hosted by the Government of China, from 19 to 24 September 1994, in Beijing. The Subcommittee also took note of the Beijing Declaration on Space Technology Applications for Environmentally Sound and Sustainable Development in Asia and the Pacific, adopted by the Conference, as well as the Strategy for Regional Cooperation in Space Applications for Sustainable Development and the Action Plan on Space Applications for Sustainable Development in Asia and the Pacific.

51. The Subcommittee noted the establishment, in October 1994, of the Asia-Pacific Satellite Communication Council (APSCC) to serve as a regional forum to promote exchanges and cooperation in the field of satellite communications and broadcasting.

52. The Subcommittee noted the contributions made by specialized agencies and other international organizations towards the promotion of international cooperation in space activities: FAO was continuing its activities relating to the remote sensing of renewable natural resources and environmental monitoring, including training courses and the support of development projects; ITU was continuing its work in the international coordination of space communications, including providing technical assistance to developing countries; WMO was continuing international cooperative programmes using space technology, including the World Weather Watch and the Tropical Cyclone Programme; UNESCO was promoting applications to space technology for archaeology, and strengthening international and interdisciplinary cooperation between archaeological projects; UNIDO was continuing its work on spin-off benefits of space technology; International Maritime Satellite Organization (INMARSAT) was continuing to develop its satellite communication system for maritime, aeronautical and land-mobile communications, including the development of small, low-cost terminals and the provision of technical assistance and training; International Telecommunications Satellite Organization (INTELSAT) was further developing its system for international satellite communications and broadcasting, including its programmes for training and technical assistance; ESA was continuing its programme of international cooperative space activities, including training programmes for the benefit of developing countries, support of the activities of the United Nations Programme on Space Applications and technical assistance projects; ICAO was continuing its work towards implementation of communications, navigation and surveillance/air traffic management (CNS/ATM) systems.

53. The Subcommittee emphasized the importance of regional and international cooperation in making the benefits of space technology available to all countries by such cooperative activities as shared payloads, dissemination of information on spin-off benefits, ensuring compatibility of space systems and providing access to launch capabilities at reasonable cost.

III. MATTERS RELATING TO REMOTE SENSING OF THE EARTH BY SATELLITES INCLUDING, INTER ALIA, APPLICATIONS FOR DEVELOPING COUNTRIES

54. In accordance with General Assembly resolution 49/34, paragraph 13 (a)(iii), the Subcommittee continued its consideration of the item relating to remote sensing of the Earth.

55. In the course of the debate, delegations reviewed the national and cooperative programmes in remote sensing. Examples were given of national programmes in developing and developed countries and of international programmes based on bilateral, regional and international cooperation, including programmes of technical cooperation between developing countries. Countries with advanced capabilities in the field, including some developing countries, described programmes to provide assistance to developing countries.

56. The Subcommittee took note of the continuing programmes of Argentina, Australia, Brazil, China, France, Germany, India, Indonesia, Japan, Morocco, Russian Federation, Ukraine, United States and ESA for remote sensing satellites. The Subcommittee noted that the launches of the European Remote Sensing (ERS-1) satellite and the Japanese Earth Resources Satellite (JERS-1) would provide valuable microwave data to complement the multispectral data from satellites of the Landsat, Resurs, SPOT, Indian Remote Sensing (IRS) and Marine Observation Satellite (MOS) series. The Subcommittee also noted the remote sensing systems being developed for future launch, including the SAC-C of Argentina, RADARSAT of Canada, FY-2 of China, IRS-1C and IRS-P3 of India, ADEOS-1 and TRMM of Japan, various systems of the Russian Federation and the ERS-II satellite of ESA. It also took note of the activities of FAO in remote sensing of renewable natural resources, including land-cover mapping and geographic information systems, of the work of WMO in the areas of weather forecasting and storm warning and of ISPRS in promoting international cooperation in remote sensing and image processing. The Subcommittee heard a scientific and technical presentation on the remote sensing activities of France, as described in paragraph 16 of the present report.

57. The Subcommittee reiterated its view that remote-sensing activities should take into account the need to provide appropriate and non-discriminatory assistance to meet the needs of the developing countries.

58. The Subcommittee emphasized the importance of making remote sensing data and analysed information openly available to all countries at reasonable cost and in a timely manner. The Subcommittee also recognized the need for continuing free access to data from operational meteorological satellites.

59. The Subcommittee considered that international cooperation in the use of remote sensing satellites should be encouraged, both through coordination of the operations of ground stations and through regular meetings between satellite operators and users. It noted the importance of compatibility and complementarity of existing and future remote sensing systems as well as the need for continuity in the acquisition of data. The Subcommittee also noted the importance, particularly for the developing countries, of sharing experiences and technologies, of cooperation through international and regional remote sensing centres and of joint work on collaborative projects. The Subcommittee also noted the value of remote sensing systems for environmental monitoring and, in that context, stressed the need for the international community to utilize fully remote sensing data in an effort to implement fully the recommendations contained in Agenda 21[1] of the United Nations Conference on Environment and Development (UNCED) in Brazil in 1992.

60. Recalling General Assembly resolution 41/65, annex, of 3 December 1986, by which the Assembly had adopted the Principles Relating to Remote Sensing of the Earth from Outer Space, the Subcommittee recommended that at its thirty-third session it should continue its discussion on remote sensing activities conducted in accordance with those Principles during its consideration of the agenda item concerning remote sensing.

61. The view was expressed that the international community should organize, on an annual basis, an International Space Day, which would be celebrated through special events, such as symposia, conferences and technical meetings, in all countries.

62. The Subcommittee recommended that the item should be retained on its agenda as a priority item for the next session.

IV. USE OF NUCLEAR POWER SOURCES IN OUTER SPACE

63. In accordance with General Assembly resolution 49/34, paragraph 13 (a)(iv), the Subcommittee continued its consideration of the item relating to the use of nuclear power sources in outer space.

64. The Subcommittee recalled that the General Assembly had adopted the Principles Relevant to the Use of Nuclear Power Sources in Outer Space, as contained in its resolution 47/68 of 14 December 1992. While noting that the Principles provided that they should be reopened for review and revision by the Committee no later than two years after their adoption, the Subcommittee also recalled that at its last session, the Committee agreed (A/49/20, para. 68) that the Principles should remain in their current form until amended and that before amendment, proper consideration should be given to the aims and objectives of any proposed revision.

65. The Subcommittee agreed that, at the present time, revision of the Principles was not warranted.

66. The Subcommittee agreed that regular discussions on this issue should continue at future sessions and that the Subcommittee and the Working Group on nuclear power sources should continue to receive the widest input on matters affecting the use of nuclear power sources in outer space and any contribution related to improving the scope and application of the Principles.

67. The Subcommittee noted the statement made by IAEA drawing attention to recent developments in nuclear safety, particularly the joint FAO/IAEA/ILO/OECD-NEA/PAHO new International Basic Safety Standards for Protection against Ionising Radiation and for the Safety of Radiation Sources, and the new document on Emergency Planning and Preparedness for Nuclear Powered Satellite Re-Entry, due to be published in 1995.

68. Mindful of the differences in the application of safety standards to space and terrestrial systems, the Subcommittee agreed that the study of these developments, arising from the latest International Commission on Radiological Protection (ICRP) recommendations, should be continued.

69. Some delegations expressed the view that a net positive benefit should be demonstrated from the use of nuclear power sources in outer space and that this principle of justification could be satisfied on a global scale.

70. The view was expressed that the Scientific and Technical Subcommittee, at future sessions, could examine the technical aspects of the utilization of nuclear power sources for missions to the Moon and other celestial bodies.

71. In accordance with General Assembly resolution 49/34, the Working Group on the Use of Nuclear Power Sources in Outer Space was reconvened on 13 February under the chairmanship of Professor J. H. Carver (Australia). No further work was undertaken in the Working Group at this session.

72. The Subcommittee noted that in response to its recommendation, the General Assembly, in resolution 49/34, paragraph 17, had invited Member States to report to the Secretary-General on a regular basis with regard to national and international research concerning the safety of nuclear-powered satellites. The Subcommittee also noted that the General Assembly, in paragraph 32 of the same resolution, had considered that, to the extent possible, information on the problem of collisions of space objects, including those with nuclear power sources, with space debris should be provided to the Scientific and Technical Subcommittee in order to allow it to follow that area more closely. The Subcommittee noted that information had been submitted in response to those requests, as contained in document A/AC.105/593 and annex and Add.1, 2, 3 and 4 by Belgium, Canada, France, Germany, Hungary, Japan, Malta, Poland, Russian Federation, Sri

Lanka and United Kingdom as well as IAEA, International Academy of Astronautics (IAA), COSPAR and INTELSAT, contained in document A/AC.105/593. The Subcommittee heard scientific and technical presentations on the topic of nuclear power sources by the Russian Federation and the United Kingdom, as described in paragraph 16 of the present report.

73. The Subcommittee agreed that Member States should continue to be invited to report to the Secretary-General on a regular basis with regard to national and international research concerning the safety of orbiting space objects with nuclear power sources. The Subcommittee also agreed that further studies should be conducted on the issue of the collision of orbiting space objects with nuclear power sources on board with space debris and that it should be kept informed of the results of such studies.

74. The Subcommittee recommended that the item be retained on its agenda for the next session, and that the time allocated to the topic in both the Working Group and the Subcommittee should be adjusted as appropriate.

V. SPACE DEBRIS

75. In accordance with resolution 49/34, the Subcommittee continued its consideration, on a priority basis, of the agenda item on space debris, including relevant studies, mathematical modelling and other analytical work on the characterization of the space debris environment.

76. The Subcommittee recalled that during its thirty-first session it had agreed that at the next session it should focus its attention on the subject of the acquisition and understanding of data on the characteristics of the space debris environment, with a view to establishing a common understanding that could serve as the basis for its further deliberations. Some delegations expressed the view that the above subject was not given sufficient focus during the present session and needed further consideration.

77. The Subcommittee expressed its satisfaction at having the subject of space debris as a priority agenda item and agreed that consideration of space debris was important and that international cooperation was needed to expand appropriate and affordable strategies to minimize the potential impact of space debris on future space missions.

78. In accordance with resolution 49/34, paragraph 12, the Subcommittee focused its attention on the acquisition and understanding of data on the characteristics of the space debris environment.

79. The Subcommittee agreed that it was important to have a firm scientific and technical basis for future action on the complex attributes of space debris and that the Subcommittee should, inter alia, focus on understanding aspects of research related to space debris, including debris measurement techniques; mathematical modelling of the debris environment; characterizing the space debris environment; and measures to mitigate the risks of space debris, including spacecraft design measures to protect against space debris.

80. The Subcommittee agreed that it could be desirable to compile information on various steps taken by space agencies for reducing the growth or damage potential of space debris and to encourage common acceptance by the international community, on a voluntary basis.

81. The Subcommittee took note of the following programmes of Member States and organizations on the acquisition and understanding of data on the characteristics of the space debris environment, and on measuring, modelling and mitigating the orbital debris environment. These programmes include the Long Duration Exposure Facility (LDEF), Material Exposure in Low Earth Orbit (MELEO) and Advanced Composite Material Exposure Experiment (ACOMEX) experiments of Canada; the Tracking and Image Radar Station (TIRA) of Germany; the Haystack Orbital Debris Radar, the Orbital Debris Radar Calibration

Spheres (ODERACS-1 and 2), the Charged Couple Device (CCD) Debris telescope, the Liquid Metal Mirror Telescope (LMMT) of the United States; the Communication Research Laboratory (CRL) and Middle and Upper Atmosphere (MU) radar system of Japan; the various monitoring facilities and analytical models established by the Russian Federation; and the Space Debris Reference Model (MASTER) of ESA .

82. The Subcommittee noted that the Interagency Orbital Debris Coordination Committee (IADC), with the participation of NASA, ESA, STA/NASDA and the Russian Space Agency (RSA), had been formed in 1993 to enable its members to exchange information on space debris activities, facilitate opportunities for cooperation in space debris research, review the progress of ongoing activities and identify debris mitigation options.

83. In order to advance in its consideration of space debris, the following work plan was adopted by the Subcommittee:

1996: Measurements of space debris, understanding of data and effects of this environment on space systems

Measurements of space debris comprise all processes by which information on the near-Earth particulate environment is gained through ground- and space-based sensors. The effect (impact of particulates and resulting damage) of this environment on space systems should be described.

1997: Modelling of space debris environment and risk assessment

A space debris model is a mathematical description of the current and future distribution in space of debris as a function of its size and other physical parameters. Aspects to be addressed are:

- Analysis of fragmentation models
- Short- and long-term evolution of the space debris population
- Comparison of models.

The various methods for collision risk assessment should be critically reviewed.

1998: Space debris mitigation measures

Mitigation comprises reduction of the space debris population growth and protection against particulate impact. Measures for the reduction of space debris growth include methods for debris prevention and removal. Protection against space debris includes:

- Physical protection with shielding
- Protection through collision avoidance.

Each session should review the current operational debris mitigation practices and consider future mitigation methods with regard to cost efficiency.

84. The Subcommittee agreed that the work plan should be implemented with flexibility and agreed that, notwithstanding the selection of a specific topic for the next session, delegations wishing to address the Subcommittee at that time on other aspects of scientific research related to space debris should be free to do so.

85. In accordance with General Assembly resolution 49/34, paragraph 32, the Subcommittee agreed that Member States should pay more attention to the problem of collisions of space objects, including those with

nuclear power sources on board, with space debris, and other aspects of space debris. It noted that the Assembly, in the same resolution, had called for the continuation of national research on that question for the development of improved technology for the monitoring of space debris and for the compilation and dissemination of data on space debris. The Subcommittee recalled the request of the Assembly that information on those issues should be submitted to the Scientific and Technical Subcommittee and took note of the reports submitted to it in accordance with that request contained in documents A/AC.105/593 and Add.1, 2, 3 and 4. The Subcommittee further agreed that national research on space debris should continue and that Member States should make the results of that research available to all interested parties.

86. The Subcommittee took note of the informal working paper submitted on space debris by the United Kingdom as well as the national reports submitted and contained in document A/AC.105/593 and Add.1, 2, 3 and 4.

87. The Subcommittee heard scientific and technical presentations on the subject of space debris by France, India, Poland, United Kingdom and ESA, as mentioned in paragraph 15 of the present report.

88. The Subcommittee noted that a certain amount of research on space debris had already been undertaken in some countries, which had allowed for a better understanding of the sources of debris, the areas in near-Earth orbit that were reaching high levels of space debris density, the probabilities and effects of collisions and the necessity of minimizing the creation of space debris. The Subcommittee encouraged Member States and relevant international organizations to provide information on practices that they had adopted and that had proven effective in minimizing the creation of space debris.

89. Some delegations were of the view that the Legal Subcommittee should be informed of the discussions in the Scientific and Technical Subcommittee on that agenda item. The view was also expressed that a set of international rules for the launch of spacecraft should be codified, based on current practices of space agencies, in order to reduce the growth of orbital debris.

90. Other delegations expressed the view that it would not be appropriate to discuss the issue of space debris in the Legal Subcommittee or to develop recommendations in the Scientific and Technical Subcommittee to underpin new legal norms for orbital debris in view of the many technical issues that still need to be discussed by the Scientific and Technical Subcommittee .

91. Some delegations expressed the view that the primary focus of the Subcommittee in dealing with this item should be on international cooperation, while the aim of improving the understanding of scientific and technical progress is pursued in its deliberations.

92. Some delegations expressed the view that data relating to space debris including size, mass and orbital elements should be accessible to all interested researchers worldwide. It was suggested that, in this context, international data networks could be used to provide such access on an open and timely basis.

93. Some delegations expressed the view that a clear goal of its work on space debris was to arrive at a set of cooperative actions and technically feasible measures to deal with the problem of debris in orbit around the Earth. Establishing a sound scientific and technical rationale for these should be integral to this objective.

94. Some delegations expressed the view that open access to research data and to a standard model for consistency in analysis and results should be available for all countries.

95. The view was expressed that the Subcommittee should establish a working group to discuss space debris and that it was important for the Subcommittee to have a common understanding of the term "space debris". In this regard, it was proposed that the Subcommittee should adopt the following explanation of the term:

Space debris are all man-made objects, including their fragments and parts, in Earth orbit or re-entering the dense layers of the atmosphere that are non-functional with no reasonable expectation of their being able to assume or resume their intended functions or any other functions for which they are or can be authorized.

96. The Subcommittee recommended that the item be retained on its agenda as a priority item for its next session.

VI. QUESTIONS RELATING TO SPACE TRANSPORTATION SYSTEMS AND THEIR IMPLICATIONS FOR FUTURE ACTIVITIES IN SPACE

97. In accordance with General Assembly resolution 49/34, the Subcommittee continued its consideration of the item relating to space transportation systems.

98. In the course of the discussion, delegations reviewed national and international cooperative programmes in space transportation systems, including expendable launchers, reusable space shuttles and space stations. In particular, the Committee noted that China was continuing the use and development of its Long March series of launch vehicles; that India was continuing development of the Geostationary Satellite Launch Vehicle and had succeeded in the developmental launches of the Augmented Satellite Launch Vehicle and the Polar Satellite Launch Vehicle; that Japan had successfully launched the H-II launch vehicle and was continuing its development of the J-I and M-V launch vehicles; that the Russian Federation had launched space objects of various types using expendable launchers of the Soyuz, Cosmos, Proton and other series, and had sent a number of national and international crews to the Mir space station; that Ukraine was continuing to produce, successfully use and improve the Tsyklon and Zenit rocket launchers; that the United Kingdom was cooperating with the Russian Federation and Ukraine on the concept of the reusable interim HOTOL system and with ESA in its Future European Space Transportation Investigation Programme (FESTIP); that the United States was continuing its programme of expendable launches and flights of the reusable Space Shuttle and was developing the International Space Station in cooperation with Canada, Japan, the Russian Federation and ESA; and that ESA was continuing development of the Ariane series of launch vehicles.

99. The Subcommittee took note of developments in low-cost microsatellite technology and applications that could allow more countries to take an active part in space activities.

100. The Subcommittee stressed the importance of international cooperation in space transportation in order to provide all countries with access to the benefits of space science and technology.

101. The Subcommittee recommended that consideration of the item be continued at its next session.

VII. EXAMINATION OF THE PHYSICAL NATURE AND TECHNICAL ATTRIBUTES OF THE GEOSTATIONARY ORBIT; EXAMINATION OF ITS UTILIZATION AND APPLICATIONS, INCLUDING, INTER ALIA, IN THE FIELD OF SPACE COMMUNICATIONS, AS WELL AS OTHER QUESTIONS RELATING TO SPACE COMMUNICATIONS DEVELOPMENTS, TAKING PARTICULAR ACCOUNT OF THE NEEDS AND INTERESTS OF DEVELOPING COUNTRIES

102. In accordance with General Assembly resolution 49/34, the Subcommittee continued its consideration of the item relating to the geostationary orbit and space communications. The Subcommittee heard a special presentation on matters related to the agenda item by the expert from ITU, as mentioned in paragraph 16 of the present report.

103. In the course of the discussion, delegations reviewed national and international cooperative programmes in satellite communications, including progress in communications satellite technology that would make satellite communications more accessible and less expensive and increase the communications capacity of the geostationary orbit and the electromagnetic spectrum.

104. The Subcommittee took note of the growing use of communications satellite systems for telecommunications, television broadcasting, data networks, environmental data relay, mobile communications, disaster warning and relief, telemedicine and other communications functions.

105. Some delegations expressed the view that the geostationary orbit was a limited natural resource and that saturation should be avoided in order to ensure that all countries had non-discriminatory access to the orbit. Those delegations felt that a special sui generis legal regime was required to ensure equitable access by all States, particularly developing countries. They felt that the role of ITU, which concerned the technical aspects, and of the Committee on the Peaceful Uses of Outer Space with respect to the geostationary orbit were complementary. Other delegations expressed the view that questions relating to the geostationary orbit were being addressed effectively by ITU.

106. Some delegations expressed the view that in considering the question of equitable access, account should be taken in particular of the characteristics of the equatorial countries. The view was expressed that a definition of the geostationary orbit, as proposed in working paper A/AC.105/C.2/L.192 of 30 March 1993, should be revised to be in line with the definition used by ITU.

107. Some delegations noted that the use of the geostationary orbit, like other orbits, was affected by the problem of space debris and that efforts were needed to minimize the generation of debris in the orbit and to move satellites shortly before the end of their useful lives into disposal orbits beyond the geostationary orbit.

108. The Subcommittee recommended that consideration of the item relating to the geostationary orbit and space communications be continued at its next session.

VIII. PROGRESS IN NATIONAL AND INTERNATIONAL SPACE ACTIVITIES RELATED TO THE EARTH ENVIRONMENT, IN PARTICULAR PROGRESS IN THE GEOSPHERE-BIOSPHERE (GLOBAL CHANGE) PROGRAMME

109. In accordance with General Assembly resolution 49/34, the Subcommittee continued its consideration of the item concerning progress in national and international space activities related to the Earth environment, in particular progress in the Global Change Programme. The Subcommittee heard a special presentation on matters related to the agenda item by an expert from France, as mentioned in paragraph 16 of the present report.

110. The Subcommittee noted the progress being made through international cooperation in the Global Change Programme, with the participation of many countries. It noted that such a joint international effort was of fundamental importance for examining the future habitability of the planet and for managing the common natural resources of the Earth. The Subcommittee took particular note of the need to involve as many countries as possible in the scientific activities of the Programme, both in developed and in developing countries.

111. The Subcommittee took note of the important contributions of satellite remote sensing for environmental monitoring, for planning sustainable development, for water-resource development, for monitoring crop conditions, and for predicting and assessing drought.

112. The Subcommittee noted the important contribution of meteorological and atmospheric research satellites for studying global climate change, the greenhouse effect, the degradation of the ozone layer and other global environmental processes. The previously launched Topex/Poseidon oceanographic satellite, Upper Atmosphere Research Satellite, Total Ozone Mapping System, CRISTA-SPAS, third Atmospheric Laboratory for Applications and Science (ATLAS-3) and Lidar in Space Technology Experiment (LITE) were important tools for that purpose, as would be the planned Phase II Mission to Planet Earth, Earth Observing System (EOS) series of spacecraft, Envisat, the IRS series of spacecraft, ADEOS, Meteor and other similar spacecraft. The Subcommittee noted the need for further space research relating to climate change, weather patterns, vegetation distribution, storm and flood risk, and other environmental factors.

113. The Subcommittee noted the importance of international cooperation in the various existing and planned satellite systems for environmental monitoring. It recommended that other States consider participating in such cooperative activities.

114. The Subcommittee recommended that consideration of the item be continued at its next session.

IX. MATTERS RELATING TO LIFE SCIENCES, INCLUDING SPACE MEDICINE

115. In accordance with General Assembly resolution 49/34, the Subcommittee continued its consideration of the item relating to life sciences.

116. The Subcommittee recalled that the General Assembly, in its resolution 49/34, had considered it particularly important that all countries should have the opportunity to use the techniques resulting from medical studies in space.

117. The Subcommittee noted that studies of human and animal physiology under the microgravity conditions of space flight had led to important advances in medical knowledge in such areas as blood circulation, sensory perception, immunology and the effects of cosmic radiation. It noted that important new information in those fields had been obtained through experiments on the Mir space station, particularly during the joint ESA-Russian Federation mission, which had utilized equipment provided by Austria, Bulgaria, France and Germany; the United States Space Shuttle mission of the International Microgravity Laboratory, including experiments from Canada, France, Germany, Japan and ESA; STS 63 mission of the United States Space Shuttle including a cosmonaut from the Russian Federation; and the recoverable scientific experiment satellites of China. The Subcommittee heard a special presentation by the expert from the Austrian Society for Aerospace Medicine, as described in paragraph 16 of the present report.

118. The Subcommittee noted that applications of space technologies were demonstrating growing promise in medicine and public health on Earth. Satellite communications for telemedicine were providing expert medical advice to distant areas, as illustrated by the Telemedicine Spacebridge to Moscow linking medical centres in the United States and the Russian Federation. The Subcommittee also noted that products of space biotechnology, such as pharmaceutical and medical instruments, could contribute to improved health care. The Subcommittee noted the importance of space technology for those purposes and encouraged further research and exchange of information on those applications.

119. The Subcommittee noted that space studies in life sciences and medicine had important potential benefits for all countries and that efforts should be made to promote international cooperation to enable all countries to benefit from those advances.

120. The Subcommittee recommended that consideration of the item be continued at its next session.

X. MATTERS RELATING TO PLANETARY EXPLORATION AND MATTERS RELATING TO ASTRONOMY

121. In accordance with General Assembly resolution 49/34, the Subcommittee continued its consideration of the item on planetary exploration and the item on astronomy.

122. The Subcommittee noted that several planetary exploration missions were currently under way. The Magellan spacecraft had completed its systematic radar and gravity field mapping programme of Venus and had provided unique information during its aerobraking experiments in the dense Venus atmosphere. The Galileo spacecraft, on its way to Jupiter, had produced high-resolution images of asteroid 243 Ida and discovered its tiny satellite Dactyl. The ESA Ulysses spacecraft, following its swing-by trajectory from Jupiter, was studying the solar polar regions that had not been previously investigated. The Subcommittee noted plans for missions planned for future launch, including Mars 94 and 96, Mars Surveyor and Pathfinder, for investigation of Mars; Cassini/Huygens, for investigation of Saturn and its moons; and the Near-Earth Asteroid Rendezvous (NEAR) and Rosetta missions. The Subcommittee heard a special presentation by Austria on Austrian experience in planetary research, as described in paragraph 16 of the present report. The Subcommittee noted the high degree of international cooperation in all of those investigations and stressed the need to further enhance international cooperation in planetary exploration to enable all countries to benefit from and participate in those activities.

123. The Subcommittee noted that the use of spacecraft for making astronomical observations from above the atmosphere had greatly advanced knowledge of the universe by allowing observations in all regions of the electromagnetic spectrum. It noted that with the repaired Hubble Space Telescope, Rosat, Granat and Roentgen-Kvant X-ray observatories, Compton Gamma Ray Observatory, Extreme Ultraviolet Explorer, Astro-D, Freja Koronas I and Wind satellites, and with data from the recent Stretched Rohini Scientific Satellite (SROSS C-2) as well as ORFEUS-SPAS and Spartan subsatellites, astronomers had powerful tools for their investigations of the universe. The planned launches of the Radioastron satellite, Spektr-Roentgen-Gamma observatory, Infrared Space Observatory, Advanced X-ray Astrophysics Facility, Space Infrared Telescope Facility, Spektr-UV, Relict-2, Scientific Applications Satellite (SAC-B) and X-ray Multi-Mirror Mission (XMM) would open up further realms of the universe to detailed observation. The Subcommittee noted with satisfaction that all of those projects were open to broad international cooperation. The Subcommittee also heard a special presentation by IAU on adverse environmental impacts on astronomy with special reference to the severe impact of electromagnetic pollution on radio astronomy and the effects of space debris on astronomical observations particularly at optical wavelengths.

124. The Subcommittee recommended that consideration of the items be continued at its next session.

XI. THE THEME FIXED FOR SPECIAL ATTENTION AT THE 1995 SESSION: APPLICATION OF SPACE TECHNOLOGY FOR EDUCATION, WITH PARTICULAR EMPHASIS ON ITS USE IN DEVELOPING COUNTRIES

125. In accordance with General Assembly resolution 49/34, the Subcommittee paid special attention to the theme "Application of space technology for education, with particular emphasis on its use in developing countries". The Subcommittee noted with satisfaction that, at its invitation, COSPAR and IAF had organized a symposium on the theme on 6 and 7 February 1995, as described in paragraphs 13 and 14 of the present report.

126. The Subcommittee also heard special presentations on the special theme by Canada and the Russian Federation, as well as by the International Space University and the Globe Foundation, as described in paragraph 16 of the present report.

127. The Subcommittee took note of the important contributions that space technology could make in the field of education. Recent dramatic increase of the volume of knowledge is leading to the necessity of correspondingly adjusting learning procedures for children and adults as well. Space education is usually defined as a method of education, which takes into account human existence being included in space as environment. This means that it is not limited only to the use of space technology - such as communication satellites - for education, but it should lead to a more complex understanding of the place and role of humankind in its global environment. It was also noted that space education should not be performed solely by space agencies or similar national or international organizations, but rather in close cooperation with relevant educational institutions.

128. The Subcommittee also noted that invaluable experience with new educational methods, including space education, has been obtained by many Member States and national and international organizations and that appropriate use of this experience could substantially improve learning procedures, particularly in developing countries. It was also noted that the Eurisy workshop "Distance learning and environmental awareness: the role of satellites", held at ESRIN (Frascati, Italy) in September 1994, provided some interesting conclusions and recommendations in this respect.

XII. OTHER MATTERS

A. Third UNISPACE conference

129. The Subcommittee noted that the General Assembly, in its resolution 49/34, paragraph 26, had agreed that the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space could be convened in the near future and had also agreed that, prior to recommending a date for the Conference, there should be a consensus recommendation on the agenda, venue and funding of the Conference. The General Assembly further recommended that the Scientific and Technical Subcommittee should continue its examination of other means for achieving the goals set for such a conference. The Subcommittee also noted the agreement of the General Assembly, in paragraph 29 of the same resolution, that the discussions to be held by the Subcommittee should provide the basis for a prompt decision by the Committee on a recommendation to the Assembly regarding the agenda, timing, funding and organization of such a conference.

130. The Subcommittee noted with satisfaction that in accordance with its recommendation, the Secretariat had prepared in time for consideration by the Committee at its last session a comprehensive report on the likely organization, funding and logistical implications of holding such a conference, including an analysis of UNISPACE 82, its organization, funding and logistics, as well as an analysis of various combinations of duration, scope and venue for a third UNISPACE conference (A/AC.105/575). The Subcommittee also noted with appreciation that following a request of the Committee, the Secretariat had compiled, in time for consideration by the Subcommittee, a document which contained the various ideas regarding the agenda and organization of the third UNISPACE conference submitted to the Committee (A/AC.105/575/Add.1).

131. The Subcommittee, through its Working Group of the Whole, carried out the tasks entrusted to it by the General Assembly in resolution 49/34, paragraph 27. The Subcommittee, in adopting the report of the Working Group, noted the views of the Working Group of the Whole as outlined in its report, contained in annex II to the present report. In adopting the report, the Subcommittee agreed that the report of the Working

Group should provide the basis for continued discussions by the Committee on a recommendation to the General Assembly as envisaged in resolution 49/34.

B. Other reports

132. The Subcommittee welcomed the annual reports of WMO (A/AC.105/597), EUTELSAT (A/AC.105/598), INTELSAT (A/AC.105/599), EUMETSAT (A/AC.105/600), ITU (A/AC.105/603) and ISPRS (A/AC.105/604). The Subcommittee requested those organizations to continue to report on their work.

133. The Subcommittee expressed its appreciation to COSPAR for its report on the progress of space research and to IAF for its report on space technology and applications published jointly under the title "Highlights in space: Progress in space science, technology and applications, international cooperation and space law, 1994" (A/AC.105/583).

134. The Subcommittee noted with appreciation the participation in its session of representatives from United Nations bodies, specialized agencies and permanent observers, and found their statements and reports helpful in enabling the Subcommittee to fulfil its role as focal point for international cooperation in space.

C. Review of the future role and work of the Scientific and Technical Subcommittee

135. The Subcommittee recommended that the agenda of its thirty-third session should include the following priority items:

(a) Consideration of the Programme on Space Applications and the coordination of space activities within the United Nations system;

(b) Implementation of the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82);

(c) Matters relating to remote sensing of the Earth by satellites including, inter alia, applications for developing countries;

(d) Use of nuclear power sources in outer space;

(e) Space debris.

136. The Subcommittee recommended that the agenda of its thirty-third session should also include the following items:

(a) Questions relating to space transportation systems and their implications for future activities in space;

(b) Examination of the physical nature and technical attributes of the geostationary orbit; examination of its utilization and applications, including, inter alia, in the field of space communications, as well as other questions relating to space communications developments, taking particular account of the needs and interests of developing countries;

(c) Matters relating to life sciences, including space medicine;

(d) Progress in national and international space activities related to the Earth environment, in particular progress in the International Geosphere-Biosphere (Global Change) Programme;

(e) Matters relating to planetary exploration;

(f) Matters relating to astronomy;

(g) Consideration of the theme fixed for special attention at the thirty-third session of the Scientific and Technical Subcommittee: "Utilization of micro- and small satellites for the expansion of low-cost space activities, taking into account the special needs of developing countries".

137. The Subcommittee recommended that, regarding agenda item (g) in paragraph 136 above, COSPAR and IAF, in liaison with Member States, should be invited to arrange a symposium, with as wide a participation as possible, to be held during the first week of the thirty-third session, to complement discussions by the Subcommittee on the special theme.

138. The Subcommittee, during its general exchange of views, discussed the possibility of having a more streamlined and focused agenda in the future and agreed that these discussions should be continued at its next session and considered when the provisional agenda was being drawn up.

139. With regard to the dates for the thirty-third session, the Subcommittee recommended that it be scheduled from 12 to 23 February 1996.

D. Tribute

140. The Subcommittee expressed its appreciation to the Chairman, Professor John H. Carver of Australia, who announced he would be retiring after the current session after having served as Chairman of the Subcommittee for 25 years. The Subcommittee noted that during his tenure, Professor Carver had made a significant and lasting contribution to the promotion of international cooperation in the peaceful uses of outer space, and wished him well in his future pursuits. At the 464th meeting of the Subcommittee on 16 February 1995, Professor Carver was presented with a testimonial letter from the Secretary-General of the United Nations thanking him for his 25 years of dedicated service to the international community.

Notes

[1] Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992 (United Nations publication, Sales No. E.93.I.8 and corrigenda), vol. I: Resolutions Adopted by the Conference, resolution 1, annex II.

Annex I

DOCUMENTS BEFORE THE SCIENTIFIC AND TECHNICAL SUBCOMMITTEE AT ITS THIRTY-SECOND SESSION

Item 1 - Adoption of the agenda

A/AC.105/C.1/L.200	Provisional agenda, with annotations, for the thirty-second session

Item 4 - United Nations Programme on Space Applications and the coordination of space activities within the United Nations system

Item 5 - Implementation of the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space

A/AC.105/556/Add.1	Report on the United Nations/European Space Agency Training Course for African Francophone Countries on Applications of the European Remote Sensing Satellite (ERS-1) Data for Natural Resources, Renewable Energy and the Environment (Frascati, Italy, 19-30 April 1993)
A/AC.105/580	Report on the Fourth United Nations/European Space Agency Workshop on Basic Space Science, hosted by the Government of Egypt (Cairo, Egypt, 27 June-1 July 1994)
A/AC.105/581	Report on the Fourth United Nations Training Course on Remote Sensing Education for Educators, held in cooperation with the Government of Sweden (Stockholm and Kiruna, Sweden, 2 May-10 June 1994)
A/AC.105/582	Report of the Ad Hoc Inter-Agency Meeting on Outer Space Activities (United Nations Office at Vienna, 3-5 October 1994)
A/AC.105/584	Seminars of the United Nations Programme on Space Applications: Selected papers on remote sensing, satellite communications and space science, 1995
A/AC.105/586	Report on the United Nations Workshop on Enhancing Social, Economic and Environmental Security through Space Technology, hosted by the Government of Austria (Graz, Austria, 12-15 September 1994)
A/AC.105/587	Coordination of outer space activities within the United Nations system: Programmes of work for 1995 and 1996 and future years
A/AC.105/588	Report on the United Nations/European Space Agency Workshop on Microwave Remote Sensing Applications, hosted by the Government of China (Beijing, China, 14-18 September 1994)
A/AC.105/589	Report on the United Nations/International Astronautical Federation Symposium on Benefits of Space Technology for the Developing World: From Economic Growth to Environmental Protection (Israel, 6-9 October 1994)
A/AC.105/591	Satellite-based radio broadcasting services

A/AC.105/592 and Add. 1, 2, 3 and 4	Implementation of the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space: International cooperation in the peaceful uses of outer space: activities of Member States
A/AC.105/594	Report on the United Nations/European Space Agency Training Course for Latin American and Caribbean Countries on the Monitoring of Natural Resources, Renewable Sources of Energy and the Environment using Data from the European Remote Sensing Satellite (18-28 April 1994, Frascati, Italy, and 29 April 1994, Rome)
A/AC.105/595	Report of the United Nations Expert on Space Applications
A/AC.105/596	Report on the United Nations/European Space Agency Workshop on Global Change and Training Course on Microwave Remote Sensing Applications (Lima, 3-4 and 5-14 October 1994)
A/AC.105/601	Implementation of the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space: International cooperation in the peaceful uses of outer space: Programmes of international organizations

Item 7 - Use of nuclear power sources in outer space

Item 8 - Space debris

A/AC.105/593 and Add.1, 2 and 3	National research on space debris: safety of nuclear-powered satellites: Problems of collisions of nuclear-power sources with space debris

Item 10 - Examination of the physical nature and technical attributes of the geostationary orbit; examination of its utilization and applications, including, inter alia, in the field of space communications, as well as other questions relating to space communications developments, taking particular account of the needs and interests of developing countries

Item 12 - Progress in national and international space activities related to the Earth environment, in particular progress in the Geosphere-Biosphere (Global Change) Programme

A/AC.105/590	Global Change: Participation of developing countries and possibilities of enhancing it

Item 15 - The theme fixed for special attention at the 1995 session of the Scientific and Technical Subcommittee: "Application of space technology for education, with particular emphasis on its use in developing countries"

Item 16 - Other matters

(a) Third UNISPACE

A/AC.105/575/Add.1	Matters related to the possible holding of a third United Nations Conference on the Exploration and Peaceful Uses of Outer Space

(b) Other reports

A/AC.105/583	Highlights in space: Progress in space science, technology and applications, international cooperation and space law, 1994
A/AC.105/597	Report of the World Meteorological Organization
A/AC.105/598	Report of the European Telecommunications Satellite Organization
A/AC.105/599	Report of the International Telecommunications Satellite Organization
A/AC.105/600	Report of the European Organisation for the Exploitation of Meteorological Satellites
A/AC.105/602	Membership of the Committee on the Peaceful Uses of Outer Space
A/AC.105/603	Report of the International Telecommunication Union
A/AC.105/604	Report of the International Society for Photogrammetry and Remote Sensing

Working Group of the Whole to Evaluate the Implementation of the Recommendations of UNISPACE 82

A/AC.105/C.2/WG.6/L.10 and Add.1, 2 and 3	Draft report of the Working Group of the Whole to Evaluate the implementation of the Recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space on the work of its ninth session

Annex II

REPORT OF THE WORKING GROUP OF THE WHOLE TO EVALUATE THE IMPLEMENTATION OF THE RECOMMENDATIONS OF THE SECOND UNITED NATIONS CONFERENCE ON THE EXPLORATION AND PEACEFUL USES OF OUTER SPACE ON THE WORK OF ITS NINTH SESSION

1. The Working Group of the Whole to Evaluate the Implementation of the Recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82) was re-established for its ninth session by the Scientific and Technical Subcommittee in accordance with General Assembly resolution 49/34, paragraph 15, of 9 December 1994, with a view to improving the execution of activities relating to international cooperation, particularly those included in the United Nations Programme on Space Applications, and to proposing concrete steps to increase such cooperation as well as to make it more efficient. The Working Group held a series of meetings from 8 to 16 February 1995, during the thirty-second session of the Scientific and Technical Subcommittee. At its meeting on 16 February 1995, the Working Group adopted the present report.

2. Mr. Muhammed Jameel (Pakistan) was elected Chairman of the Working Group. The Chairman, in his opening statement, reviewed the mandate of the Working Group for its ninth session and the status of the implementation of the recommendations of UNISPACE 82.

3. In accordance with resolution 49/34, paragraph 15, the Working Group of the Whole continued its assessment of the implementation of the recommendations of UNISPACE 82. The Working Group had before it a number of studies and reports prepared by the Secretariat, Member States and international organizations, contained in documents A/AC.105/592, Add.1, 2, 3 and 4, A/AC.105/595 and A/AC.105/601. The Subcommittee also had before it two technical studies prepared by the Secretariat, one on Global Change: Participation of developing countries and possibilities of enhancing it (A/AC.105/590), and one on Satellite-based radio broadcasting services (A/AC.105/591).

4. The Working Group noted that the Secretariat was also in the process of preparing additional technical studies on the subjects it had suggested at its previous session, as outlined in document A/AC.105/571, annex II, paragraph 17.

5. The Working Group noted with satisfaction the valuable efforts of the United Nations, Member States and other international organizations to implement the recommendations of UNISPACE 82.

6. The Working Group agreed on the following conclusions and recommendations, keeping in view the priorities contained in General Assembly resolution 49/34, paragraph 13.

I. SHORT-TERM TRAINING AND LONG-TERM EDUCATION

7. The Working Group noted with appreciation that training courses in remote sensing, satellite communications and other topics have been organized for the benefit of developing countries with the assistance of the United Nations. Such seminars and workshops on advanced applications of space science and technology and on new technological developments should continue to be organized regularly. At the same time, the recent advances in space technologies and applications for development should be brought to the attention of planners, administrators and decision makers in the developing countries. Member States, particularly the developed countries, and international organizations are requested to support the training programme on an ongoing basis.

II. INTERNATIONAL AND REGIONAL COOPERATION

8. The Working Group noted with appreciation the reports prepared by the Office for Outer Space Affairs on the resources and technological capabilities of States in space activities as well as in the areas of education, training, research and fellowship opportunities for the promotion of cooperation in the peaceful uses of outer space. Those reports should continue to be periodically updated by the Office for Outer Space Affairs.

9. The Working Group recommended that in the light of the continued development of space activities, the Committee on the Peaceful Uses of Outer Space should request all States, particularly those with major space or space-related capabilities, to continue to inform the Secretary-General annually, as appropriate, about those space activities that were or could be the subject of greater international cooperation, with particular emphasis on the needs of the developing countries.

10. Similarly, the Committee should also request international organizations with space-related activities to continue to inform the Secretary-General annually concerning those space activities that were or could be the subject of greater international cooperation, with particular emphasis on the needs of the developing countries.

III. INFORMATION, STUDIES AND TECHNICAL ADVISORY SERVICES

11. In order to promote the development of national space programmes, including higher education in space-related subjects, the United Nations should continue to arrange, upon request, for the provision of expert consultants from developed and developing countries to assist in the preparation of integrated national plans of action for initiating, strengthening or reorienting appropriate space applications programmes, which should be in conformity with other national development programmes.

IV. OTHER MATTERS

A. Priority areas

12. The Working Group considered that, in further efforts to promote the applications of space science and technology for development, priority should be given to the following areas:

(a) Stimulation and support of the growth of indigenous nuclei and an autonomous technological base in space technology in developing countries. UNISPACE 82 recommended the free exchange of scientific and technological information and an arrangement for the transfer of technologies to promote the use and development of space technology in the developing countries. UNISPACE 82 also recommended that countries should not place undue restrictions on the sale of components, subsystems or systems required for peaceful space applications. A greater international understanding therefore needs to be evolved to overcome the difficulties faced by the developing countries in this respect;

(b) Promotion of a greater exchange of actual experiences in space applications. UNISPACE 82 recommended appropriate assistance and called particularly upon international financial agencies to support demonstration projects to provide opportunities for hands-on experience in space technology and applications for the developing countries through direct involvement in such applications projects or pilot projects;

(c) United Nations funding. The Programme on Space Applications should be given the full support of the United Nations in order to fully implement the recommendations of UNISPACE 82. That recommendation was made on the understanding that the Office for Outer Space Affairs would give priority

to the full implementation of the Programme on Space Applications within the available resources of its regular budget;

(d) Voluntary contributions. Appreciation was expressed for the support of Member States and international organizations in the form of cash and in-kind contributions for the activities being undertaken by the Programme on Space Applications for the implementation of the UNISPACE 82 recommendations. Those Member States and international organizations were requested to continue their support and other Member States and international organizations were urged to provide cash and in-kind contributions for Programme activities, in particular those that are not implemented due to a lack of financing.

B. Third UNISPACE

Introduction

13. The General Assembly, in its resolution 47/67, paragraph 20, of 14 December 1992, recommended that the Committee on the Peaceful Uses of Outer Space at its 1993 session should begin discussions on the possibility of holding a third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE). Pursuant to that recommendation, the Scientific and Technical Subcommittee and the Committee at their 1993 sessions considered in general terms the question of holding such a conference, including the goals and objectives for the proposed conference, as well as matters related to organization, venue, timing and funding implications.

14. In response to a request contained in General Assembly resolution 48/39, paragraphs 22 and 23, the Scientific and Technical Subcommittee and the Committee continued their discussions on the matter in 1994, and agreed that they should define a set of sharply focused objectives for such a conference, including details such as organization, venue, timing and funding, with a view to promoting an early conclusion on the matter by the Committee. Resolution 48/39, paragraph 24, noted that the goals set for such a conference might be achieved through other means, including intensification of work within the Committee.

15. Working papers on various matters related to the holding of such a conference were submitted by Pakistan (A/AC.105/C.1/L.191), India (A/AC.105/C.1/L.195) and the Group of 77 (A/AC.105/C.1/L.199). The latter represented an amalgamation and expansion of the views contained in the Indian and Pakistani papers. At this session the Government of India reiterated its offer, originally made at the thirty-sixth session of the Committee in 1993, to host a third UNISPACE conference at its Space Centre in Bangalore.

16. The Subcommittee, in paragraph 113 of its report (A/AC.105/571), requested the Secretariat to prepare, in time for the next session of the Committee, a comprehensive report on the likely organization, funding and logistical implications of holding such a conference. The report should include an analysis of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82), held in Vienna, Austria, in August 1982, including its organization, funding and logistics, as well as an analysis of various combinations of duration, scope and venue (including United Nations headquarters cities and other sites) for a third UNISPACE Conference.

17. In accordance with that request, the Secretariat submitted a report to the Committee at its thirty-seventh session in June 1994 (A/AC.105/575). To facilitate further consideration of the matter, the Committee requested the Secretariat to compile a document, in time for consideration at the current session of the Scientific and Technical Subcommittee, containing the various ideas submitted to the Committee regarding the agenda and organization of a third UNISPACE Conference. In accordance with that request, the Secretariat brought out a report contained in document A/AC.105/575/Add.1.

18. The General Assembly, in its resolution 49/34, paragraph 26, of 9 December 1994, agreed that the Third United Nations Conference on the Exploration and the Peaceful Uses of Outer Space could be convened in the near future and also agreed that, prior to recommending a date for the Conference, there should be a consensus recommendation on the agenda, venue and funding of the Conference. The General Assembly further recommended that the Scientific and Technical Subcommittee, at its thirty-second session, should conduct a thorough analysis and define an agenda for such a conference, and agreed that the Subcommittee should discuss a broad range of themes and subjects that could be refined into a sharply focused and detailed agenda and should also continue its examination of other means of achieving the goals set for such a conference. These discussions should provide the basis for a prompt decision by the Committee on a recommendation to the General Assembly regarding the agenda, timing, funding and organization of the Conference.

19. While examining the matters related to a possible holding of the third UNISPACE Conference, during the thirty-second session of the Scientific and Technical Subcommittee, the Working Group of the Whole of the Subcommittee set up an informal, open-ended drafting group under the Chairmanship of Mr. Richard Tremayne-Smith (United Kingdom) with the task of preparing a report on the matter, based on discussions among members and the background material already available. Such a report, when adopted by the Working Group of the Whole and the Subcommittee, could undertake the tasks entrusted by the General Assembly to the Subcommittee, as noted in paragraph 18, above.

20. The drafting group held seven meetings. Based on these discussions, the report of the drafting group was formulated in a way that sets out the varied views of all delegations on such a conference. The drafting group also developed an indicative agenda for such a conference, as contained in the appendix to the present annex, which encompassed a broad range of themes and subjects that could be refined into a sharply focused and detailed agenda at a later stage. The Working Group of the Whole agreed that further discussions would take place at the thirty-eighth session of the Committee on the Peaceful Uses of Outer Space.

21. In addition to the above background, the drafting group had the benefit of the views expressed by Member States during the thirty-second session of the Scientific and Technical Subcommittee.

1. The opportunity

22. The first and second United Nations Conferences on the Exploration and Peaceful Uses of Outer Space were held with a time-gap of 14 years. It has already been 12 years since the last UNISPACE conference, held in 1982. Since then, there have been rapid advances, particularly in recent years, in all fields of space science and technology and in other relevant fields such as electronics, computer technology and materials science. The possibilities for practical applications that could provide economic benefits have also multiplied and have resulted in an increased role of the private sector in planning and implementing space activities. Also since then, the international political scene has changed and the perspectives and opportunities for international cooperation have been influenced by these changes, requiring a new assessment by the international community.

23. Since the beginning of the 1980s, when the last conference was held, developments have brought about corresponding changes in the perception of international space activities. The end of the Cold War has brought about cooperation partnerships between Member States that were heretofore not possible. In addition, the United Nations is currently adapting itself to this new international configuration and its participation in international space activities needs to be examined.

24. Another significant change relates to the growth, at the international level, of the awareness of the importance of the environment and the interdependence of countries. This growing awareness led to the convening of the United Nations Conference on the Environment and Development (UNCED) in 1992, which

succeeded in bringing about a new recognition and acceptance of the concept of "sustainable development", and the adoption by the Conference of the Agenda 21 plan of action. Many countries have made commitments to Agenda 21 that they intend to fulfil with or without significant use of space technology. At the same time, there have been great advances in all aspects of space technology, particularly those that contribute to sustainable development and the protection of the environment. These developments present a unique opportunity to establish the relationship between space applications and sustainable development and point to a strong need and justification for including the implementation of Agenda 21 in the agenda of any effort focusing on international cooperation and space applications.

25. While the States that are most active in space are members of the Committee on the Peaceful Uses of Outer Space, the 124 Member States that are not members of the Committee are also users of space technology. A third UNISPACE Conference would provide those States with the opportunity to participate fully in United Nations discussions on the peaceful uses of outer space. It would thus provide the members of the Committee with an opportunity to exchange information on space activities, policies, priorities and needs with those States and would encourage the broader use of space applications and participation in space activities.

26. Many countries, including those that are not members of the Committee on the Peaceful Uses of Outer Space, are in need of space applications and have an interest in space activities. Taking note of major changes in international science, including significant advances in space science and technology, since the last Conference in 1982, it is reasonable, after such a long gap, to provide a forum for all Member States to consider the policy-level issues related to outer space and its use under the framework of a United Nations conference. No other forum could effectively substitute or provide the catalytic role of a third UNISPACE Conference, particularly in meeting the challenges of maintaining and increasing effective international cooperation in this field, as it would not have the participation of all countries.

27. While other forums, such as the Space Agency Forum for the International Space Year, organized in the context of the International Space Year in 1992, have been quite effective in expanding international cooperation in space activities under universally relevant themes, such as "Mission to Planet Earth", their effect was primarily on countries with established space programmes. The expansion of such cooperation to include the needs of the developing countries in terms of their effective participation would require a third UNISPACE Conference. Such a conference could provide the necessary forum for matching existing capabilities in space and the strengths of available forums with current demands in developing countries. In addition, any conference should be informed of the progress of the work of such bodies as CEOS and the Space Agency Forum.

28. Another opportunity that exists is the possibility of examining ways and means of utilizing outer space as a non-renewable resource in a sustainable manner.

2. The objectives of the conference

29. The basic objective of the proposed third UNISPACE conference would be to promote effective means of using space technology to assist in the solution of problems of regional or global significance and to strengthen the capabilities of Member States, in particular developing countries, to use the applications of space research for economic, social and cultural development.

30. As a way of achieving this primary objective, the proposed conference should include a review of the recent developments in space activities including advances in space technology, new economic and social applications, and economic factors limiting the development of space technology and its applications. On the basis of that review, a third UNISPACE conference would consider how States can make the best use of existing systems and opportunities and how international cooperation should be strengthened, where

necessary, to provide new systems, applications and further opportunities for international cooperation for the general benefit of Member States. In particular, a third UNISPACE conference could consider, inter alia, how international cooperation in the field of remote sensing, weather and climate observations and environmental monitoring could be strengthened to promote the use of such systems by all States.

31. Together with the ways of achieving the primary objective, another objective or desirable result would be that developing countries would define their needs for space applications for development purposes in advance of any conference. At the same time, the conference would analyse the relationships between commercialization of space technology, national development plans and the building of indigenous capabilities with a view to further encouraging the partnership of the developing countries in the development and utilization of these technologies.

32. Another objective would be to consider ways of expediting the use of space applications in Member States to promote sustainable development, particularly through the implementation of the recommendations of Agenda 21 of UNCED as well as their participation in international programmes such as Mission to Planet Earth and the International Geosphere-Biosphere Programme or in various applications of satellite communications for commercial, educational or health purposes.

33. A third UNISPACE conference could address the various issues related to education, training and technical assistance in space science and technology and their applications aimed at the development of indigenous capabilities in all States to ensure that all can, in practice as well as in principle, use data from space systems.

34. The conference could serve as a valuable forum for increasing awareness of the general public regarding the benefits of space technology and critical evaluation of the value of space activities.

3. Organization of the conference

35. The drafting group considered various suggestions relating to the organization of the Conference, contained in document A/AC.105/575, paragraphs 52 to 78. The views that follow were also expressed by Member States during their discussions. The drafting group noted that the general principle of the General Assembly, that United Nations conferences and meetings should plan to meet at their respective established headquarters, should be considered as the starting point in considering the venue of the Conference.

36. The organization of the Conference should permit the participation of all States Members of the United Nations, including those who are not members of the Committee on the Peaceful Uses of Outer Space. It would be necessary to involve those Member States during the preparatory phases.

37. Such a conference would require thorough preparation and therefore the holding of such a conference in 1996 or 1997 is unrealistic. In addition, the resource requirements of the United Nations Programme on Space Applications should be carefully reviewed to ensure that the Programme could be effectively oriented towards conference preparations during the 18-month period prior to the conference. Such considerations should be taken into account in setting the date for the conference. In addition, the overall programme of major United Nations conferences should be taken into account in recommending a date in order to ensure that the financial burden is manageable within the scope of the overall United Nations budget.

4. Examination of achieving the goals set for the conference by other means, including intensification of work in the committee

38. The Working Group of the Whole noted that, through intensification of its work, the Committee could address several of the items which would result from an agenda based on some of the objectives that have

been indicated. For instance, the Committee could analyse the implications that the end of the Cold War might have for international cooperation on space activities. The Committee could also invite experts in relevant fields to make presentations to it and to prepare working documents to be reviewed by the Committee.

39. The Committee could also invite contributions, to be presented at its sessions, from a number of groups that specialize in a field of space science or technology to review recent scientific and technological developments. The Working Group of the Whole noted that groups such as the Space Agency Forum, the Committee on Earth Observation Satellites, the International Astronautical Federation, the Committee on Space Research and other such regional or international groups could provide the Committee with a valuable view of the current status and the expected developments in their respective fields.

40. The Working Group of the Whole also noted that some elements to be pursued in fulfilling the objectives of a possible third UNISPACE conference could be addressed in regular or ad hoc meetings of the groups referred to above as well as in regional or international conferences, symposia or meetings that address a range of themes and applications.

41. While recognizing that specialized groups, such as those mentioned above, can provide valuable insight into the important issues that concern specific space matters, the Working Group of the Whole noted that membership and participation in such groups and in their activities was of a diverse nature. In particular, the Working Group of the Whole noted that the work and discussions of these groups are primarily oriented to scientific and technical subjects and that high-level officials responsible for national development policy do not regularly participate in such events.

42. Recalling that space technology has an important role to play in economic and social development such as in implementing the recommendations of UNCED and Agenda 21 and that many countries which are not members of the Committee are or could be utilizing space technology for this and other purposes, the Working Group of the Whole agreed that a global conference on space, organized by the United Nations, could be an appropriate forum in which to discuss issues related to international cooperation, space policies, the participation of the private sector and implementation or follow-up actions relating to these questions as well as to other issues that might be of universal concern.

43. The Working Group of the Whole was of the view that the objectives indicated for a third UNISPACE conference could be better achieved if it examined space activity and international cooperation in this area as a whole and if during its preparatory phase, the forums provided by specialized groups and other regional or international conferences, symposia and meetings are utilized to define a few focused themes to be dealt with by a third UNISPACE conference. Specialized groups, such as those referred to above, should be invited to participate in the conference to assist in preparing realistic goals to be reached by it and achievable plans for follow-up actions that fall within their mandates.

44. In considering the convening of a third UNISPACE conference, the Committee should work with and involve major organizations in the above fields. These specialized groups may well be the best or most appropriate route to achieving the results required. Involving a group with a mandate in a specific field of space from the beginning, setting targets for it and asking it to report regularly on its progress is better than having all the recommended actions tied to a United Nations committee with limited resources. In addition, it would be desirable to identify mechanisms for input to and feedback from major funding organizations to pull through any resulting actions.

45. Some delegations expressed the view that, for tackling problems that require close coordination among countries, such as natural disaster management, a technical conference rather than a United Nations conference could be more effective.

46. The view was also expressed that the suggested agenda item on a review of existing mechanisms to augment the scientific and technical capabilities of developing countries, particularly those for education and training, is covered by the normal cycle of United Nations meetings and regular reports.

5. Additional ideas for consideration

47. It was recalled that during its 1994 session, the Committee on the Peaceful Uses of Outer Space accepted, in principle, that a third UNISPACE conference could be convened. It had been agreed that a formal decision on holding a conference would be made only after a thorough and balanced analysis of the agenda, venue and funding of such a conference. It was pointed out that the Subcommittee should hold discussions that could provide the basis for a prompt decision on the matter.

48. Some delegations expressed the view that not enough consideration had been given to the task of examining the possibility of achieving the goals set for a third UNISPACE conference through other means. Among these means, intensification and restructuring of the working plan, inter alia, the setting of the agenda of the Committee on the Peaceful Uses of Outer Space and its subcommittees should be carefully examined.

49. The view was expressed that as a result of the opportunities reflected in the report of the drafting group there now exists an opportunity for the international community to consider the needs of all countries with regard to space technology and the links between the various mechanisms that are available to meet those needs. The first step in this process, the outcome of which should be a major determining factor in a decision to convene a third UNISPACE conference, would be the development of a set of themes relating to space science and technology of common interest to the international community. Once this process is completed, it would then be possible to initiate discussion on how these issues could be most effectively addressed, whether through a third UNISPACE conference, existing mechanisms and forums for international cooperation in space activities or a combination of such measures.

Ideas regarding a possible agenda

50. It was agreed that the agenda of a possible third UNISPACE conference should be focused, well-balanced and consistent with the interests and needs of all countries. The agenda and preparations should be developed in such a way as to ensure that the conference is able to propose specific, well-defined and pragmatic recommendations. The entire spectrum of issues related to space development and related economic or security aspects cannot be included into such a focused agenda.

51. Some delegations suggested that international cooperation should not be contained in a rigid framework. Such cooperation should recognize the elements of voluntary interests among cooperating partners. The agenda of a possible third UNISPACE conference and possible deliberations should recognize these inherent aspects.

52. One of the elements recognized as essential for the growth of space activities, including commercial developments, is capacity building for space applications of all countries, particularly developing countries. It is stressed that a major conference such as a third UNISPACE conference should examine and review aspects related to education and training in space, which plays an important role in generating indigenous capabilities in developing countries.

Ideas regarding financial and other aspects related to holding a third UNISPACE conference

53. The members of the drafting group agreed that, while formulating recommendations regarding the possible holding of a third UNISPACE conference, a pragmatic and realistic appraisal of how those

recommendations would be implemented should be conducted and that this should necessarily include consideration of the available resources needed to implement those recommendations.

54. Some delegations expressed the view that, given both existing international cooperation and the severe financial constraints facing the United Nations and Member States, a third UNISPACE conference was not advisable at this time.

55. It was noted that the normal United Nations practice is to hold two major United Nations conferences a year and, if a third UNISPACE conference is scheduled as one such conference, it could be financed within the zero growth budget policy followed by the United Nations. It was also noted that if the conference is hosted by a Member State, all additional financial obligations resulting in the conference being held in that country, as compared to at a United Nations headquarters, would be borne by that country in accordance with relevant General Assembly specifications.

56. Some delegations suggested that the possibility of limiting the duration of the proposed conference, as well as the duration of other meetings, should be explored in order to reduce the financial burden. As a further cost-reducing measure, the possibility that the sessions of the Legal Subcommittee and the Scientific and Technical Subcommittee could be held consecutively, with an overlap of one week, to examine matters that required the views of both subcommittees, should be explored.

Ideas regarding the objectives of a possible third UNISPACE conference

57. The view was expressed that the initial development of objectives for a third UNISPACE conference should not be too narrowly defined, bearing in mind that pre-conference efforts could fine-tune or redefine the objectives.

58. Recognizing its achievements and considering some of the drawbacks of the Second UNISPACE Conference, it was agreed that a detailed analysis is required to ensure that a third UNISPACE conference does not result in recommendations that are too general, ill-defined and idealistic.

Other relevant ideas

59. Some delegations expressed the view that issues related to the revitalization of the Committee on the Peaceful Uses of Outer Space could be better dealt with through the Committee itself rather than through a third UNISPACE conference.

C. Future work

60. The Working Group recommended that it be reconvened next year to continue its work.

Appendix to annex II

INDICATIVE AGENDA OF A POSSIBLE THIRD UNISPACE CONFERENCE

1. This indicative agenda has not been given detailed consideration, but is provided as a framework for future discussions by the Subcommittee and the Committee.

2. The agenda of the conference could be organized with three central themes and subjects as follows:

(a) Possibilities of cooperation in space science, technology and research;

(b) Applications of space science and technology, including those for sustainable development;

(c) Enhancing international cooperation in the utilization of space technology and applications.

3. Areas of particular emphasis should include:

(a) Expansion of participation in initiatives such as Mission to Planet Earth, started during the International Space Year 1992, through the Space Agency Forum, in order to promote and enable the participation of many countries, particularly developing countries;

(b) Major developments in space science and technology which provide opportunities and means for increased international cooperation;

(c) The contributions of space technology for promoting national and international programmes aimed at environmental protection and sustainable development.

4. The following is a suggested detailed agenda for a third UNISPACE conference.

Committee I: Possibilities of cooperation in space science, technology and research

A. Evaluation of major developments in space science, technology and applications, and assessment of their utility for future economic and social development.

B. The future of solar system and planetary exploration.

C. Design, development and use of mini- and micro-satellites for space research.

D. Space- and ground-based astronomy.

E. The use of microwave systems for geophysical studies and oceanographic research.

F. Review of technical issues related to space debris, ensuring the safety of future space activities.

H. Better, faster and cheaper means of reaching space, including the case of human space flight.

J. Development of joint projects in the fields of space science, applications and exploration by scientists from developing and developed countries.

Committee II: Applications of space science and technology, including those for sustainable development

A. Environmental applications

1. Examining ways of improving space-based monitoring of the state of the global environment and improving archives, dissemination, use and exchange of Earth observation data; application of space technology in monitoring the environment at local and regional scales. Examination of mechanisms to integrate space technology and applications into international programmes to promote environmental protection and economic development.

2. Improving international cooperation in development and implementation of satellite-based disaster warning systems and utilization of space technology for mitigation and relief in natural, technological and industrial disaster situations.

3. Enhancing cooperation in the collection and dissemination of meteorological data from satellites and other sources.

B. Space technology for development applications

1. Remote sensing:

(a) Improving capabilities for the reception, processing and utilization of remote sensing data for sustainable development and management of natural resources;

(b) Improving distribution systems to ensure availability of remote sensing data, especially to developing countries, and ensuring the complementarity of remote sensing data.

2. Navigation:

(a) Improving methods to ensure continuity in the availability of satellite-based position-location/navigational services and exploring the possibility of cooperative global navigational satellite systems;

(b) Enhancing international cooperation in satellite-based search-and-rescue systems, including development of common standards for ship and aircraft locator beacons.

3. Communications:

(a) Promoting regional cooperation in the planning, design, operation and utilization of satellite communication and broadcasting systems;

(b) Examining the uses of mobile satellite communications and other new technologies, including low-cost, lightweight satellites in non-geostationary orbits (lightsats), for rural communications;

(c) Promoting other uses of satellite-based systems, notably for tele-education, tele-medicine and family welfare, and emergency communications;

(d) Examination of issues related to transnational satellite direct broadcasting, including protection of intellectual property rights.

4. Secondary applications of space technology:

(a) Potential uses of space for manufacturing specialized/unique products and materials;

(b) Industrial applications of spin-offs from space technologies.

Committee III: Enhancing international cooperation in the utilization of space technology and applications

A. Review of existing mechanisms to augment the scientific and technical capabilities of developing countries, particularly those for education and training, so that they may participate in and benefit from space activities, focusing on basic space science applications, exchange of information and experiences.

B. Review of existing mechanisms for international cooperation in space activities, consideration of ways and means for enhancing cooperation among Member States, the United Nations, its specialized agencies and other international organizations, with particular emphasis on the United Nations Programme on Space Applications.

C. International cooperation in maintaining and using the outer space environment - scope for new initiatives.

D. Review of existing global and regional funding sources available for cooperative space applications programmes and development of strategies for utilizing those sources.

E. Examination of the role of space technology in promoting international peace and security, including the development of confidence-building measures for space activities and the conversion of military space technology for civilian purposes.

F. Review of the current status and the need for continued progressive development and codification of the law of outer space, including ways and means of promoting wider adherence to international space treaties, establishment of guidelines for international cooperation in space exploration and utilization, and examination of links between space law and other branches of international law, such as environmental law.

Additional scientific and technical component of a third UNISPACE conference

5. In order to ensure adequate discussion of scientific and technical issues, particularly as they relate to the items on the agendas of Committee I and Committee II, it is proposed that, in addition to the regular Committee sessions, there be an additional scientific and technical component in the form of the following:

Poster sessions: A series of scientific poster sessions should be held at the conference facility and be open to participants and observers throughout the conference. The posters/papers will highlight the results from ongoing scientific and technical space projects and will be presented by national space agencies and international scientific organizations;

Public evening lectures: To be given by eminent scientists in various space-related scientific disciplines on subjects of broad interest to conference participants and the general public;

Workshops/seminars: To be held as part of the conference and to be organized by interested specialized agencies of the United Nations and other international organizations on topics relevant to their expertise and mandates. For example: communications (ITU), remote sensing (CEOS/FAO/UNEP), navigation (ICAO/IMO), meteorology (WMO), basic space science (UNESCO/COSPAR/IAF) and astronomy (IAU).